

**IN THE CLAIMS:**

The following is a complete listing of claims in this application.

1. (previously presented) The method according to claim 17, wherein said step of processing comprises:

encapsulating said tagged segment into a Point-to-Point Protocol (PPP) packet in a frame; and

mapping the encapsulated packet into a transmission frame for transmission over an optical fiber.

2. (original) The method according to claim 1, wherein said tagged segment is encapsulated into a PPP packet in a High bit rate Digital Link Control (HDLC)-like frame.

3. (original) The method according to claim 1, wherein said transmission frame is a Packet over SONET (PoS) frame.

4. (original) The method according to claim 1, wherein said transmission frame is a Packet over SDH (PoS) frame.

5. (original) The method according to claim 2, wherein said transmission frame is a Packet over SONET (PoS) frame.

6. (original) The method according to claim 2, wherein said transmission frame is a Packet over SDH (PoS) frame.

7. (original) The method according to claim 3, further comprising the step of scrambling the encapsulated packet before the step of mapping into a transmission frame.

8. (original) The method according to claim 1, wherein said step of adding a tag includes adding an MPLS tag.

9. (original) The method according to claim 1, further comprising the steps of:

de-packing said transmission frame in a receiver to retrieve said encapsulated PPP packet;

de-capsulating said encapsulated PPP packet to retrieve said tagged segment of a bit stream; stripping off the tag to retrieve said segment of a bit stream; and

assembling a plurality of said segments to re-create the original bit stream.

10. (original) The method according to claim 9, further comprising the step of unscrambling a scrambled encapsulated PPP packet, after the step of de-packing.

11. (previously presented) The method according to claim 5, further comprising the steps of:

de-packing said Packet over SONET packet in a receiver to retrieve said encapsulated PPP packet in HDLC-like form;

de-capsulating said encapsulated PPP packet to retrieve said tagged segment of a bit stream;

stripping off the tag to retrieve said segment of said bit stream; and

assembling a plurality of said segments to re-create the original bit stream.

12. (previously presented) The engine according to claim 19, wherein said processing modules comprise:

an encapsulating module for encapsulating the tagged segment into a Point-to-Point Protocol (PPP) packet in a frame; and

a mapping module for mapping the encapsulated packet into a transmission frame for transmission over an optical fiber.

13. (original) The engine according to claim 12, wherein said PPP packet is encapsulated in a High bit rate Digital Link Control (HDLC)-like frame.

14. (original) The engine according to claim 12 wherein said transmission frame is a Packet over SONET/SDH (PoS) frame.

15. (original) The engine according to claim 13 wherein said transmission frame is a Packet over SONET/SDH (PoS) frame.

16. (currently amended) The engine according to claim 12,

wherein said tagging module is arranged to add an MPLS tag to each segment.

17. (currently amended) A method for packet processing for data transmission over an optical fiber, the method comprising the steps of:

receiving ~~an~~ at least two incoming bit ~~stream~~ streams of data, each containing ~~of at least~~ one service;

segmenting each said bit stream in its original protocol into variable length segments ~~according to available transmission bandwidth;~~

adding a tag to each segment, each tag including data identifying a route between a source and a destination end-point of ~~the~~ its bit stream; and

processing each of said tagged segment segments from said bit streams into a single ~~for transmission in a~~ transmission frame for transmission;

~~whereby utilization of available bandwidth capacity is optimized.~~

18. (currently amended) The method according to claim 17, wherein ~~the~~ two of said incoming bit ~~stream~~ streams of data ~~comprises at least two~~ contain different services.

19. (currently amended) An engine for packet processing and data transmission with optimization of available bandwidth capacity, the engine comprising:

at least ~~one~~ two service ~~port~~ ports, each for receiving an incoming bit stream of data ~~of at least~~ containing one service;

a segmentation module for segmenting each said bit ~~stream~~ streams in its original protocol into variable length segments ~~according to available transmission bandwidth;~~

a tagging module for adding a tag to each segment, each tag including data identifying a route between a source and a

destination end-point of ~~the~~ its bit stream; and

at least one processing module for processing ~~each~~ said tagged segment segments from said bit streams into a single  
~~for transmission in a~~ transmission frame for transmission.

20. (new) The method according to claim 17, wherein two of said incoming bit streams of data contain the same service.